

Scatterplots and Pearson's r for C@S data

Bivariate numerical data from a random sample of CensusAtSchool data was used to generate scatter plots and to consider the strength of any relationships found in the data.

1. Predict whether each relationship is positive or negative and complete the sentences with ‘increases’ or ‘decreases’.

a) Time taken to get to school v Age “As age increases the time taken to get to school *increases*.”

b) Age v Age “As age increases, age *increases*. *(Please note although nonsensical, students need to be aware that a perfect correlation will occur when a variable is graphed against itself. This can alert them that data may have been entered incorrectly)*

c) Time spent watching TV v Age “As age increases the time spent watching TV *decreases*.”

d) Hours of homework completed per week v Belly-button height “As belly button height increases the amount of homework completed *increases*.”

e) Age v Birth year “As birth year increases a person’s age *decreases*.”

f) Time taken to complete the questionnaire v Age “As age increases the time taken to complete the questionnaire *decreases*.”

g) Arm span v Height “As height increases, arm span *increases*.”

h) Year level v Year of birth “As year of birth increases, a person’s year level *decreases*.”

i) Foot length v Belly button height “As belly button height increases, foot length *increases*.”

j) Length of foot v Year of birth “As year of birth increases, foot length *decreases*.”

2. Write the letter of each sentence into the table below and so predict Pearson’s r .

Perfect positive 1	Perfect negative -1
<i>(b) (r = 1)</i>	<i>(e) (r = - 1)</i>
Strong positive 0.75 > 1	Strong negative -0.75 < - 1
<i>(g) (r = 0.93)</i>	<i>(h) (r = - 0.93)</i>
Moderate positive 0.50 > 0.75	Moderate negative -0.75 < - 0.50
<i>(i) (r = 0.71)</i>	<i>(j) (r = - 0.62)</i>
Weak positive 0.25 > 0.50	Weak negative -0.5 < -0.25
<i>(d) (r = 0.35)</i>	<i>(c) (r = - 0.33)</i>
Almost no positive relationship 0 > 0.25	Almost no negative relationship - 0.25 < 0

(a) ($r = 0.22$)

(f) ($r = -0.20$)

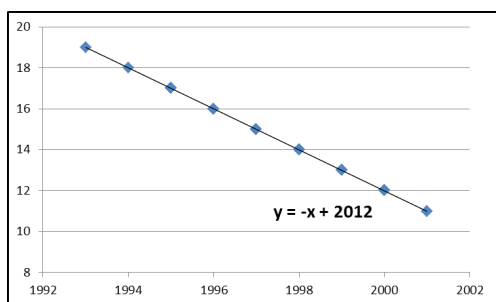
3. Each of the following graphs represents one of the above relationships.

- Match each graph with the appropriate sentence.
- Use the equation to write a sentence in terms of the variables.
- Explain the significance of the gradient and the y intercept.

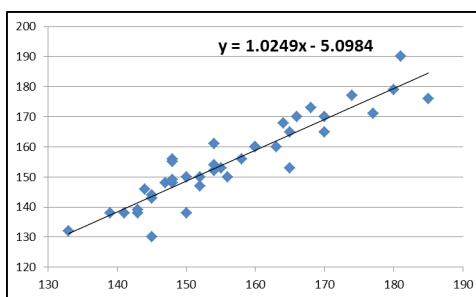
E.g. Foot length = $0.65 \times \text{year level} + 19 \text{ cm}$

$m = 1/6$ For each increase of 1 in year level, foot length increases by 0.65 cm.

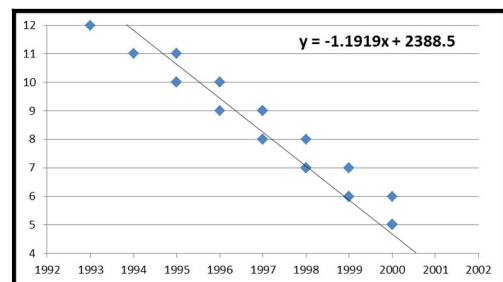
$c = 19$ When a person is in 0 year level (i.e. kindergarten age) foot length is 19 cm.



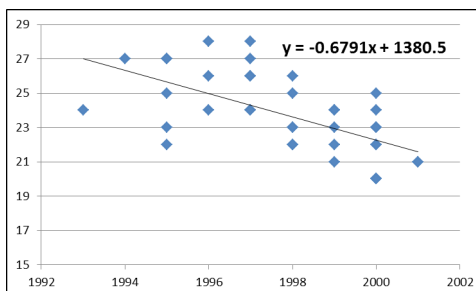
Matches sentence (e) ($r = -1$)



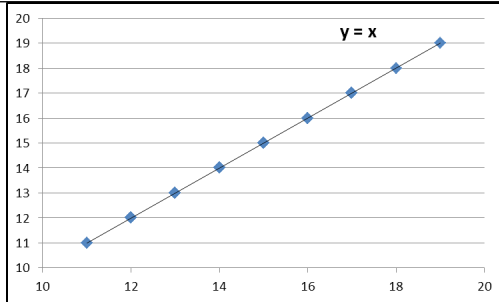
Matches sentence (g) ($r = 0.93$)



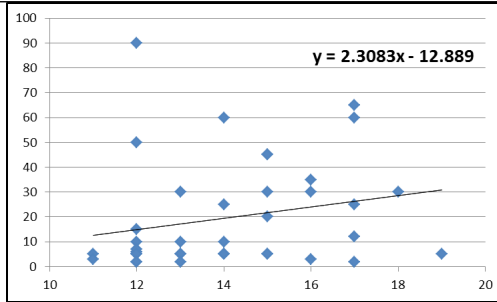
Matches sentence (h) ($r = -0.93$)



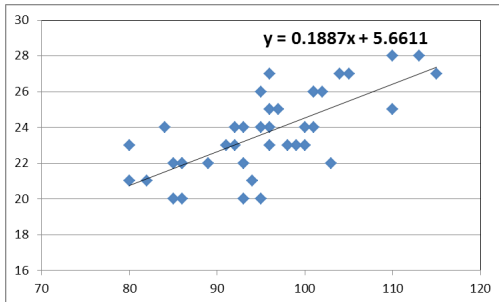
Matches sentence (j) ($r = -0.62$)



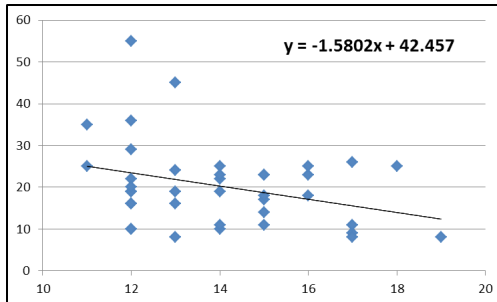
Matches sentence (b) ($r = 1$)



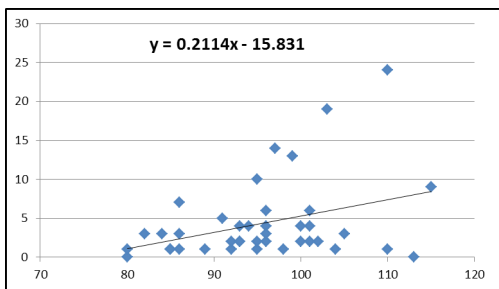
Matches sentence (a) ($r = 0.22$)



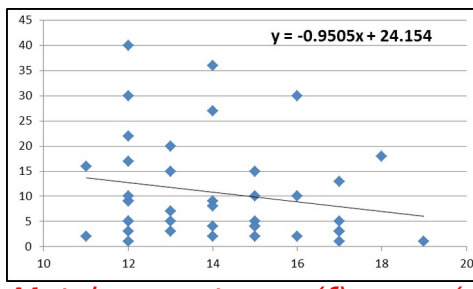
Matches sentence (i) ($r = 0.71$)



Matches sentence (c) ($r = -0.33$)



Matches sentence (d) ($r = 0.35$)



Matches sentence (f) ($r = -0.20$)